3.17 CUMULATIVE IMPACTS

3.17.1 Introduction

The State Environmental Policy Act (SEPA) requires that agencies address cumulative impacts. According to Ecology's SEPA Handbook, an EIS should look at how the impacts of a proposal would contribute to the total impact of development in the region over time (Ecology 1998). In the context of the proposed Project, cumulative impacts are identified largely on the basis of significant proposed and reasonably foreseeable future developments.

For the purpose of this analysis, the proposed Desert Claim and Kittitas Valley Wind Power Projects were identified as the only major reasonably foreseeable developments in the area that could contribute to cumulative impacts. The wind power projects are shown in Figure 3.17-1. The Kittitas Valley and Desert Claim Projects are relatively close to each other (within 1.6 miles at the closest point), while the Wild Horse Project is 14 miles from Desert Claim and 21 miles from the Kittitas Valley Project. The Desert Claim and Kittitas Valley Wind Power Projects are summarized below.

No other present or reasonably anticipated future project is expected to result in cumulative impacts near the Wild Horse Project. Several other wind power projects in the Pacific Northwest are either operating or proposed. The cumulative effects of these other wind power projects could be similar in nature to the effects described herein. However, for the purposes of defining the geographic scope of the cumulative study area, the Kittitas Valley, Desert Claim, and Wild Horse Wind Power Projects in Kittitas County are sufficient for the evaluation of cumulative impacts.

3.17.2 Desert Claim Wind Power Project

On January 28, 2003, Desert Claim Wind Power, a limited liability company wholly owned and managed by enXco, Inc., submitted an application to Kittitas County for permits to build and operate a wind electrical generation facility in the Reecer Creek area approximately 8 miles north of Ellensburg (Desert Claim Wind Power LLC 2003). A Draft EIS for the Desert Claim project was issued by Kittitas County in December 2003. The Desert Claim Project consists of up to 120 wind turbines with a total nameplate capacity of 180 megawatts, associated generators, towers, foundations, and pad-mounted transformers on 5,237 acres. Other Project elements include:

- Project access roads, control cables, and power collection cables necessary to serve the Project;
- One or more substations to convert Project-generated electricity to the higher voltage required to interconnect into the regional electric transmission grid;
- An overhead transmission line required to connect the Project substation with nearby high-capacity electrical transmission lines;

- An O&M facility co-located at the Project substation site or, alternatively, located in an area; and zoned for industrial use within or near Ellensburg.

3.17.3 Kittitas Valley Wind Power Project

Sagebrush Power Partners, LLC, a wholly owned subsidiary of Zilkha Renewable Energy, plans to construct, own, and operate a wind electrical generating facility (referred to as Kittitas Valley) in eastern Kittitas County, of between 82 and 150 wind turbine generators with a total nameplate capacity of between 181.5 to 246 megawatts (MW). The Project site is located on open ridgetops between Ellensburg and Cle Elum, about 12 miles northwest of the City of Ellensburg in Kittitas County, Washington. An Application for Site Certification was submitted to EFSEC in January 2003 and a Draft EIS for the Kittitas Valley Project was issued in December 2003. The Project spans approximately 5,000 acres, but only 90 acres are expected to be permanently impacted. The Kittitas Valley Project would interconnect to existing PSE and/or Bonneville transmission systems which traverse the proposed site (Peeples 2003).

3.17.4 Project Comparison

Based on information gathered from available sources, including the DEIS for the Kittitas Valley Project and the DEIS and Development Activities Application submitted to Kittitas County for the Desert Claim Project (Desert Claim Wind Power LLC 2003), the basic features of the three projects are summarized in Table 3.17-1.

Table 3.17-1: Summary of Proposed Wind Power Project Features in Kittitas County

Feature	Kittitas Valley[1]	Desert Claim	Wild Horse[2]
Number of Turbines	121	120	136
Total Nameplate Capacity	181.5 MW	180 MW	204 MW
Project Area Size	7,000 acres	5,237 acres	8,600 acres
Existing Zoning	Agriculture-20 Forest and Range	Agriculture-20 Forest and Range	Agriculture-20 Forest and Range
Construction Duration	12 months	9 months	12 months
Construction Employees	253 workers	150 workers	253 workers
Operational Employees	12-14 workers	10 workers	12-14 employees

Sources: *Sagebrush Power Partners LLC 2003a; Desert Claim Wind Power LLC 2003; Weinman 2003; Kittitas County 2003.*

Notes:

1 Data represent middle scenario, as defined in Chapter 2.

2 Assumes use of 1.5 MW turbines.

The construction schedules for the three projects have not been finalized at this time. However, the most recent preliminary schedules for the Kittitas Valley and Wild Horse Projects indicated that there is a possibility that their construction could potentially overlap for a period of about eight months. The proposed construction schedule for the Desert Claim Project is not known. However, the cumulative impact analyses presented assumes an unlikely worst-case scenario in which all three projects are constructed simultaneously during an eight-month period.

3.17.5 Earth Resources

Significant cumulative impacts on soil, topography, and geology resulting from construction of the three proposed wind power Projects in Kittitas County are not anticipated. The three project areas are not characterized by high geologic hazards. Impacts on earth resources from development of the three wind power projects would be limited to localized, temporary erosion impacts from ground disturbance during construction. The impacts on near-surface soils would be within the construction footprint for the respective Project; they would not geographically overlap each other. Consequently, there would not be an interactive effect among any two of the Projects or all three projects (e.g., erosion impacts related to the Desert Claim Project would not exacerbate erosion conditions near the Kittitas Valley Project). The combined effects of the three projects would not result in a significant cumulative impact on earth resources.

Cut and fill would be required to construct access roads, tower foundations, transformer pads, and other Project facilities. The Wild Horse Project anticipates using on-site resources for cut and fill materials. Therefore, the construction of the Wild Horse Project will not impact the availability of offsite fill resources. The specific quantity or source of anticipated cut and fill materials required for the Desert Claim Project has not been specified at this time. However, if substantial amounts of fill are required to construct facilities such as access roads, this could result in increased demand for offsite resources such as gravel or crushed rock, assuming that the Project did not use onsite resources.

3.17.6 Vegetation, Wetlands, Wildlife, and Fisheries

3.17.6.1 Vegetation

Implementation of the proposed Projects would result in the loss of vegetation through clearing and ground disturbance, including the potential loss of lithosols, a unique habitat often associated within the shrub-steppe region. The potential cumulative impacts on this lithosol habitat would depend on the quality of habitat at each Project site and the combined amount of permanent disturbance. Lithosols could occur in grassland, low sagebrush, and shrub-steppe vegetation communities.

The permanent footprint for the Wild Horse Project would displace approximately 165 acres of existing vegetation, including 139 acres of shrub-steppe. Impacts on vegetation

from development of the Desert Claim and/or Kittitas Valley Wind Power Projects would be similar to those described for Wild Horse and would generally consist of localized impacts on similar vegetation communities. Construction of Desert Claim Project facilities would result in the permanent loss of 78 acres of existing vegetative cover, and the Kittitas Valley Project would result in the permanent loss of 93 acres.

For each wind power project, the area of existing vegetation permanently displaced by the project facilities amounts to a small portion (approximately 2% or less) of the respective project area. The combined figures for the three projects amount to approximately 336 total acres of existing vegetation lost, including approximately 100 acres of lithosols. In the context of the three wind power project areas that cover approximately 17,000 acres, the approximate 2% loss of vegetation at each project site would not be considered an adverse cumulative effect.

Habitat types at the three sites are not regionally unique (Daubenmire 1970; Franklin and Dyrness 1988; Cassidy et al. 1997; Johnson and O'Neil 2001). Within about 50 miles east and south of the proposed project areas, there are several large areas of protected grassland, shrub-steppe, and sagebrush vegetation communities (e.g., the Colockum, Quilomene, and L.T. Murray wildlife areas and the Yakima Training Center) (WDFW 2003g). Therefore, the combined loss of approximately 336 acres of vegetation, would similarly not be considered cumulatively adverse in a more regional context. Because the precise regional extent of lithosols is not quantitatively known, it is difficult to assess the specific magnitude of cumulative lithosol impacts at the three wind power project sites within the context of the surrounding region.

No federally listed rare plants were identified at the Wild Horse, Kittitas Valley, or Desert Claim project sites. However, one Washington State listed species, hedgehog cactus, was found extensively in lithosol habitats at the Wild Horse Project site. Fewer than 10% of the individuals identified during the rare plant survey are considered at risk from direct impact from the Wild Horse Project. Please see Section 3.4, 'Vegetation and Wetlands', of this Application and Exhibit 12, 'Rare Plant Resources Report', for further information.

The wet meadow areas in the Desert Claim Project area provide potential habitat for the Ute ladies'-tresses, an orchid that is federally listed as endangered. Field surveys of the wet meadow habitats did not locate this species, and no other rare plants protected by either the federal or state governments were found in searches of the areas of likely disturbance in the Desert Claim Project area (Kittitas County 2003). The minimal potential impacts of the proposed wind projects on rare plants would not represent a significant cumulative impact on any species.

3.17.6.2 Wetlands

Project construction could affect wetland resources in the region. Cumulative impacts on wetlands could result from directly filling or grading wetland systems, as well as from indirect effects caused by stormwater runoff, increased pollutant loading, and water

quality degradation, which in turn could result in loss of wetland diversity and reduced wetland functions and values. No wetlands were identified within a 164-foot buffer around the planned locations for Wild Horse Project facilities; therefore, no impacts to wetlands are anticipated for the Wild Horse Project (See Section 3.4, 'Vegetation and Wetlands', of this Application for further information). The Kittitas Valley Project would disturb between 135 and 185 square feet of one potential wetland system at the project site (see Section 3.2 of the Draft EIS for the Kittitas Valley Wind Power Project).

Based on current plans for the Desert Claim Project, construction activities would temporarily disturb approximately 16 acres of wetland area, while the permanent project footprint would overlap with an area estimated at 9 acres. Final "micro-siting" for project facilities could be used to avoid at least some of these wetland areas. To the extent that avoidance of wetland areas is not feasible, mitigation would be developed to enhance or replace wetland areas (Kittitas County 2003).

The collective effects of the three proposed wind power projects would be the same as the effects identified for the Desert Claim Project. The wetland impacts of the Desert Claim Project would be minor as a result of wetland avoidance and/or required mitigation for wetlands that could not be avoided. Because the collective effects of these projects would be minor and are not expected to extend to downstream surface waters or wetlands, no significant cumulative impact on wetland resources is expected.

3.17.6.3 Wildlife

Following is a summary of the wildlife cumulative impacts analysis prepared for the Kittitas Valley, Desert Claim, and the Wild Horse Wind Projects (WEST Inc. 2003).

Big Game

The Kittitas Valley, most of Desert Claim, and all of the Wild Horse Project sites are located in mule deer winter range (WDFW Priority Habitats database). The Wild Horse Project and the northern portion of the Desert Claim Project also are located in elk winter range. The Kittitas Valley Project is not located in elk winter range. A defined elk migration corridor crosses the northern portion of the Desert Claim Project and is adjacent to the Wild Horse Project site.

Minor temporary displacement of wintering mule deer and elk is anticipated from winter construction activities of the three wind power projects. These temporary impacts may be greater if construction occurs simultaneously on two or all three of the projects because of the larger area subject to disturbance. See Section 3.6, 'Wildlife', of this Application for a discussion of the literature covering impacts of energy projects and roads on big game, especially during the winter. No impacts to elk winter range are anticipated at the Kittitas Valley or Desert Claim Projects, and the impacts from the Wild Horse Project are discussed in Section 3.6, 'Wildlife', and Exhibit 14, 'Wildlife Baseline Study'.

The Wild Horse Project area is located southeast of the mapped Quilomene elk migratory corridor. No heavy construction activity is anticipated during winter months. However,

any disturbance from surveying or other activities could result in elk in the process of moving to winter range east of the Project, avoiding areas close to the Project and traveling farther to the north. Given that the Project is located to the southeast of this movement corridor, the maximum increase in distances needed to travel would appear quite minor (<1 mile).

The same effect would be anticipated for the Desert Claim Project. The northernmost region of the Project area overlaps approximately 320 acres of the south edge of the Quilomene elk migration corridor. If this area of the Desert Claim Project influences elk use during construction or continued O&M activities, it is expected that elk will shift their path to the north without migratory hindrance due to the large size of the corridor. The maximum increase in travel distances would be less than 1 mile. The corridor, as mapped within the WDFW PHS database, is approximately 2 miles wide (north to south measurement) where the Desert Claim Project is located.

During the construction period, deer would likely be temporarily displaced from the three project sites due to the influx of humans and construction equipment and associated noise and disturbance. Temporary loss of habitat from Project construction would be considered a minor impact because of the vast expanse of suitable habitat for mule deer near the proposed Projects. Some tolerance of construction and operations activities by mule deer is expected at the Kittitas Valley and Desert Claim Projects, considering the amount of existing residential development and the existing roads and disturbance (e.g., gravel quarry) in the vicinity of those two projects. The Wild Horse Project is located in a relatively undeveloped area used primarily for livestock grazing and recreation (hunting) creating seasonal increases in the level of human activity in this area. Cumulative impacts to winter big game during construction may occur if more than one Project is constructed during the same winter.

Approximately 300 acres of mule deer winter range will be permanently lost due to the footprint of the three projects, which is <2% of vegetation at the project sites, and much less than 0.5% of the winter range located near the Project sites. Mitigation of permanent loss of habitat at Wild Horse and the Kittitas Valley sites meet or exceed the WDFW mitigation guidelines. Mitigation parcels determined for those two sites are located in mule deer winter range.

Human activity levels from operation and maintenance at the Kittitas Valley and Desert Claim projects are not expected to significantly differ from current human activity levels. Human activity levels from operation and maintenance at the Wild Horse site would occur at a low level year-round. While operational impacts on wintering mule deer and elk at the Wild Horse site may be greater than under existing conditions, cumulative impacts for all three wind power projects are expected to be low.

3.17.6.4 Birds

Raptors

Based on the estimated levels of raptor use within the three project study areas, raptor mortality is expected to be slightly higher compared to other new wind generation Projects with similar turbine types. Under the three projects, the estimated combined raptor mortality rate at all three project sites with combined turbines numbering between 361 and 391 turbines, depending on the final configuration of each project, would be between 14 and 15 raptor fatalities per year respectively. Because the Wild Horse Project is approximately 20 miles from the Kittitas Valley Project and 13 miles from the Desert Claim Project, and given the typical home-ranges of the raptors at risk for collision with the three projects, the same breeding raptors that use the Kittitas Valley and Desert Claim Project areas are not expected to use the Wild Horse Project area. Section 3.6, 'Wildlife', of this Application further addresses avian use at the Wild Horse Project.

Red-tailed hawks, American kestrels, and northern harriers account for much of the raptor use at the three projects during spring, summer, and fall. During winter and early spring, red-tailed and rough-legged hawks account for most of the raptor use. These species are expected to be the raptor species with the highest risk of mortality across the projects. The mortality risk associated with other raptor species such as turkey vulture, golden eagle, and prairie falcon is expected to be much lower than the risk for red-tailed hawks and American kestrel because of their less frequent use of the sites. Recent published data for new wind energy projects in the West indicate there have been few northern harrier fatalities recorded at these wind power sites, and no bald eagle or rough-legged hawk fatalities have been observed (Erickson et al. 2000). Golden eagle use of the three proposed project areas is low relative to other wind sites, and mortality is also expected to be low.

Bald Eagles

Based on other studies and available information, Bald Eagles occupy the Kittitas Valley from approximately late December to early April. The number of bald eagles in the valley appears to increase from late December to approximately mid- February. They are not the most common raptor in the area, but their numbers appear to be increasing most likely due to overall recovery of the species in Washington as well as throughout the western states and North America.

Cumulative impacts on bald eagles could result in loss of winter habitat and fatalities; however, the Wild Horse Project is not expected to contribute to either one of these impacts because the site does not provide good roosting or foraging opportunities (winter habitat) and use of the site was essentially incidental, resulting in insignificant mortality predictions. None of the projects would contribute to the loss of roosting habitat (which is limited to the Yakima River riparian corridor) or foraging areas (which are primarily cattle lots and calving operations), and the cumulative impact on bald eagle winter habitat from the three proposed wind power projects would be small.

To date, no bald eagle fatalities have been reported from wind power projects in the United States. The foraging behavior of wintering bald eagles, primarily scavenging, may make them less susceptible to collision with wind turbines because they are

presumably less focused on moving prey and more attentive to their surroundings while searching for carrion (dead animals). Based on infrequent use of the proposed wind power project areas in Kittitas County by bald eagles, and the lack of reported fatalities at any operating wind power projects in the United States, fatalities are expected to be low. However, due to roosting and foraging areas nearby the Kittitas Valley and Desert Claim project sites, bald eagles may regularly move through, thereby increasing their exposure. Assuming risk of collision is proportional to use, one bald eagle fatality across these two projects may occur every two to three years. The cumulative effect of this low level of mortality on the increasing bald eagle winter population in the Kittitas Valley and the state of Washington would not be measurable.

Passerines

Passerines (bird of the order Passeriforme, which includes perching birds and songbirds such as finches, warblers, sparrows, blackbirds, and jays) represent the most abundant avian fatality at other wind projects studied (see Johnson et al. 2002; Young et al. 2003b; Erickson et al. 2000, 2001, 2002). Both migrant and resident passerine fatalities have been observed. Given that passerines make up the vast majority of the avian observations at the three project sites, it is expected that passerines would make up the largest proportion of fatalities for the three projects combined. Passerine species most common to the Project sites would likely be most at risk, including the European starling, American robin, horned lark, cliff swallow, American goldfinch, Brewer's blackbird, American pipit, and vesper sparrow. Based on the mortality estimates from other wind projects studied, combined passerine mortality for the three proposed Projects would range from 430 to 740 fatalities per year. This level of mortality is not expected to have any population-level consequences for individual species because of the expected low fatality rates for most species and the high population sizes of the common passerine species such as European starling, American robin, horned lark, American pipit, and western meadowlark. A few of the species observed at these projects have documented declining populations in the Columbia Plateau including Brewer's blackbird, Brewer's sparrow, horned lark, loggerhead shrike, western meadowlark, mourning dove and killdeer. Many of these species are very common and widely distributed (e.g., western meadowlark, horned lark), but nevertheless have shown apparent declines in abundance from BBS data (Sauer 1999). Of these species, horned lark and western meadowlark appear to have the highest collision risks.

3.17.6.5 Bats

Bat fatalities are likely to occur at all three Kittitas County wind power projects. Bat research at other wind projects indicates that migratory bat species are at some risk of collision with wind turbines, primarily during the fall migration season. Most bat fatalities observed at wind projects have been tree-dwelling migratory bats, with hoary and silver-haired bats being the most prevalent. Although no specific surveys for bats have been conducted, both hoary bats and silverhaired bats may use the forested habitats near the three project sites and likely migrate though the three project areas.

Using mortality estimates from other wind projects (one to two bat fatalities per turbine per year), total annual bat mortality for all three wind power projects in Kittitas County is expected to range from 361 to 782. The significance of bat mortality from the three projects is hard to predict because there is little information available regarding the size of bat populations. Studies suggest, however, that resident bats do not appear to be significantly affected by wind turbines (Johnson et al. 2003; Gruver 2002) because nearly all mortality is observed during the fall migration period. Therefore, significant cumulative adverse impacts on resident bat populations are not expected.

3.17.6.6 Fisheries

Studies conducted for the Kittitas Valley Project did not identify any fish-bearing habitat within 0.5 mile of any proposed facility or construction location, and no impacts on fish habitat or fish species associated with construction and operation of the Kittitas Valley Project are anticipated (see Section 3.2 of the Kittitas Valley Draft EIS). Similarly, no fish are known to use the Wild Horse Project area, and the nearest fish habitat is located along Quilomene Creek approximately 1 mile north of the Project. The lower reaches of Whiskey Dick and Skookumchuck creeks also provide habitat for salmonids; these areas are approximately 5 miles downstream from the Wild Horse site. Assuming best management practices are used for erosion and sediment control (as would be required as permit conditions for all three projects), the Wild Horse Project would not adversely affect fish or fish habitat onsite or in downstream areas (Kittitas County 2003). Section 3.7, 'Fisheries', contains further information on lack of fisheries impacts at the Wild Horse site.

Development of the Desert Claim Project would result in minor disturbance or displacement impacts on streams and riparian zones in the Project area. Because none of the affected streams are known to contain fish communities, direct impacts on fish resources are expected to be negligible or nonexistent. Similarly, the potential indirect effect of the project on water quality and quantity would be a negligible effect on downstream water resources or the fish habitat they provide (Kittitas County 2003).

Proposed access road construction at the Kittitas Valley Project site would affect three streams and their associated riparian habitat for a total disturbance of between 1,041 and 1,245 square feet under the middle and lower end scenarios, respectively. However, potential impacts on the stream channels related to construction are expected to be short term and negligible with proper management (see Section 3.2 of the Kittitas Valley Draft EIS). At the Desert Claim Project site, approximately 41,645 square feet of stream and riparian habitat would be affected by temporary construction activities, with 112 square feet permanently affected by Project operations. If relocation of facilities to avoid these areas is not feasible, mitigation would be developed to enhance or replace riparian areas (Kittitas County 2003). No direct impacts on streams and riparian zones at the Wild Horse site are anticipated.

The cumulative effects of the three proposed wind power Projects would consist of negligible direct and indirect effects on water resources in three localized areas of the

Kittitas Valley. Because the effects of the respective Projects would be negligible and would not extend to downstream waters, no significant cumulative effect on fishery resources is expected (Kittitas County 2003).

3.17.7 Water Resources

As described in Section 3.3, 'Water Resources', the water resource impacts of the Wild Horse Project would be localized and temporary, primarily limited to the construction period. The water resource impacts of the Desert Claim and Kittitas Valley Projects would be similar to those described for the Wild Horse Project. All of the Projects involve the same types of construction activities and Project features, similar areas of ground disturbance, similar restoration and mitigation actions, and similar water demands. However, in the case of the Wild Horse Project, proposed construction includes development of gravel quarries and one or more concrete batch plants within the Project area. Consequently, water resource impacts associated with gravel extraction and concrete manufacture for the Wild Horse Project would be onsite and more concentrated, while these effects for the Kittitas Valley and Desert Claim Projects would be offsite and more dispersed. Construction activities for each Project would be required to follow stringent surface water protection regulations. None of the Projects would require extensive construction activity or permanent Project facilities along or near major streams. Overall, the effects of the individual Projects on water quantity and quality would be minor and would not result in noticeable changes in downstream areas.

Specific cumulative impacts on water resources from the three wind power projects would depend on the characteristics of common surface water bodies and aquifers to which the three proposed wind power Projects are hydrologically linked. Most of the Wild Horse Project area is within the drainages of Whiskey Dick and Skookumchuck creeks, which are small streams that drain eastward to the Columbia River. Part of the Wild Horse area drains to Whiskey Jim Creek and subsequently to Parke Creek, which is a minor tributary of the Yakima River that enters the river southeast of Ellensburg. Most of the Kittitas Valley Project area is located within the drainage of Dry Creek, which is an ephemeral stream that joins the Yakima River northwest of Ellensburg, while a portion of the area drains directly to the river. The Desert Claim Project area is situated within the drainages of Reecer Creek and several tributaries to Reecer Creek, which flows into the Yakima River near its confluence with Dry Creek. Neither of these streams is a major tributary to the Yakima River; Dry Creek is not a perennial stream, while Reecer Creek is perennial but has a documented flow range of 4 to 68 cubic feet per second.

Because the three projects are sufficiently distant from each other and are located in different tributary watersheds, there would not be a combined effect from multiple Projects on the same stream. The minor, localized effects of each Project would occur within the drainages of minor tributaries to the Yakima River and the Columbia River and at a distance of at least several miles upstream from either river. Therefore, significant cumulative effects on water resources within the Upper Yakima River basin or

the northeastern portion of the Kittitas Valley are not expected, even if all three projects were constructed.

3.17.8 Health and Safety

The potential for exposure to fuel and non-fuel hazardous substances would increase, particularly during the construction period if construction periods were to overlap. During construction, diesel fuel and gasoline would be used at the proposed Project sites to fuel construction equipment and vehicles. In addition, mineral oil would be used to fill pad-mounted transformers at the turbines as well as to fill substation transformers. However, the effects would be localized in the area of the spill, and not likely to result in an adverse cumulative impact.

The cumulative risk of wildfires in central and eastern Kittitas County could increase during both the construction and operational phases of the three wind power projects. The greatest fire risk for each Project would occur during the construction period because of the level of activity and number of workers and equipment active at that time. The greatest cumulative fire risk would occur if and when construction schedules for two, or all three of the Projects, overlapped. The construction program for each Project is expected to include contracted fire protection services from the respective local fire district, which would facilitate response to any incidents that might occur. Trained personnel who could respond to fire hazards would also be present at the wind power construction sites. However, even with implementation of strict fire protection and prevention measures, the cumulative risk of potential fires associated with construction of the three proposed wind turbine Projects could remain significant.

Certain fire risks specific to wind energy projects would also exist during the operating period for each Project. However, specific measures to counteract or manage these risks would be implemented during Project operation. The wind turbine machinery is designed with fire safety in mind, and the cleared areas and gravel pads around the base of the turbines and other facilities would minimize the spread of fire. The Project facilities would be continuously monitored, and the project areas would be regularly patrolled. Access to the Project areas would be limited. Furthermore, wind power operations do not preclude water application from the air for fighting fires. Therefore, with implementation of these protective measures, the concurrent operation of the three proposed wind power Projects would not likely pose a significant cumulative fire risk.

Potential risks to the health and safety of site personnel from operations and maintenance of the three proposed wind power Projects would be minor because they involve relatively small numbers of workers (ranging from 30 to 42). Worker exposure to health and safety risks at the Desert Claim and Kittitas Valley wind power sites would not be greater than those potentially experienced at the Wild Horse site. No significant cumulative impacts are anticipated if appropriate site safety procedures are implemented at each Project site. The production of wind energy raises several health and safety issues specific to wind turbines operations. Site-specific health and safety concerns include the

remote potential for ice to be thrown from rotating blades, blades to disengage and be thrown from the tower, and tower collapse during extreme weather conditions. Potential health and safety impacts from the three projects would be localized in nature, and the combined effects of the three projects would not result in a significant cumulative impact.

While the probability of any specific hazard occurring would be the same for each Project (based on similar numbers and sizes of wind turbines), the risk of exposure to those hazards would vary with the level of human activity near each Project. In general, the risk of exposure would be greatest (although still low, in probability terms) for turbines that are close to residences or public roads. Some individuals living in the northern portion of the Kittitas Valley might have common travel patterns that would involve trips through or past portions of both the Kittitas Valley and Desert Claim Project areas (e.g., along and near Green Canyon Road and Smithson Road). Based on the low probability associated with these hazards and the mitigation proposed to reduce the risks, this situation is not anticipated to involve a significant cumulative increase in health and safety risks.

Potential shadow-flicker impacts from the three proposed wind power Projects would be limited to the immediate vicinity (approximately 2,000 feet) of the wind turbines within each respective Project area. There are no occupied residences within this distance of the Wild Horse Project, and shadow-flicker impacts from this Project would be nonexistent. Some residences that are close to turbines at the Kittitas Valley or Desert Claim Projects would be subject to shadowflicker for varying hours per year. These impacts would be limited to a number of discrete locations that are well separated from each other and would not constitute a cumulative impact from these two proposed Projects (Kittitas County 2003).

The electric and magnetic fields associated with the Kittitas Valley, Desert Claim, and/or Wild Horse Wind Power Projects would be less than those produced by electrical facilities already present near the respective Project areas and would diminish to background levels at distances where public exposure could occur. Therefore, the wind power facilities would not add to the strength or extent of electric and magnetic field exposure that may already occur, and there would not be cumulative exposure impacts from development of multiple wind energy Projects (Kittitas County 2003).

3.17.9 Energy and Natural Resources

When combined with other planned wind Projects in the region, construction activity associated with the Wild Horse Project would contribute to local energy demands. The combined demands of the three projects for fuel and construction materials would cumulatively contribute to the local and regional demand for, and irreversible expenditures of, nonrenewable resources on a temporary basis. Types of nonrenewable resources include diesel fuel and gasoline to operate construction vehicles and equipment, as well as steel and concrete required to build wind power facilities. The single largest demand would be for sand and gravel resources that might, for the Kittitas Valley and Desert Claim Projects, be obtained from sources within the Project area. Overall, based

on timing considerations and the incremental resource demands associated with the Projects, the combined effects of the three projects would not result in a significant cumulative impact on energy and natural resources.

The three proposed wind power Projects would provide a combined nameplate capacity of 565 MW of electricity (under the middle scenario for the Kittitas Valley). Assuming long-term operation of the three projects at a net capacity of 33%, the Wild Horse, Desert Claim, and Kittitas Valley Projects would produce approximately 186 average MW of electricity on a long-term basis. That collective energy output would represent a substantial increase in the amount of electricity currently produced within Kittitas County. Operation of the three projects would also cumulatively add to the capacity, production, and availability of renewable energy sources in Washington State and the greater Pacific Northwest, and would provide a sustainable, renewable source of electric power supply to supplement the region's existing hydroelectric, nuclear, and coal or gas-fired power projects, although it would represent a relatively small addition to the total regional electricity supply. Utilities receiving the wind energy would be able to diversify their energy resource portfolios and stabilize a portion of their long-term energy supply costs. Power produced by the wind Projects would also be responsive to the identified needs of regional utility providers, including Avista, PSE and Pacific Power.

3.17.10 Land Use and Recreation

Development of the Wild Horse Project concurrent with the proposed Desert Claim and Kittitas Valley Projects would result in permanent conversion of approximately 336 acres of open space and rangeland uses in central Kittitas County for wind energy production. Existing land uses such as grazing could continue up to the edge of Project facilities. In the short term, proposed wind energy facilities would not collectively disrupt or change the underlying land use pattern of this portion of the county.

The three proposed wind energy Projects would require either county approval for a rezone and Comprehensive Plan amendment, or EFSEC review and Governor approval. These permitting processes, and the underlying local land use regulations, are designed to prevent incompatible uses and the degradation of agricultural land, in particular. The implementation of these regulations minimize the potential for cumulative impacts.

Temporary population increases associated with Kittitas Valley, Desert Claim, and Wild Horse Wind Project construction workers could cumulatively increase demand for and use of local and regional recreation resources during overlapping construction periods. Peak construction of each Project could employ approximately 165 workers, or a combined total of about 500 workers. Increased demand would be most anticipated for offsite regional resources that could provide temporary accommodations for transient construction workers, such as campgrounds. It is possible that access to heavily used recreational resources throughout Kittitas Valley and central and eastern Kittitas County could be limited during peak recreation use months, such as during the summer. The exact nature and extent of cumulative demands for recreational resources would depend

upon the timing of the three construction Projects. It is anticipated that upon construction completion, the permanent population increase associated with these three wind power projects (between 30 to 42 workers) would not result in substantial cumulative demands for recreation resources.

3.17.11 Socioeconomics

Cumulative impacts on population, housing, and employment must be considered when two or more large projects (wind power generating or otherwise) are proposed in the same general area with similar construction schedules. For example, if built at the same time, the construction workforce for the Kittitas Valley, Desert Claim and Wild Horse Wind Power Projects would be drawn from similar local labor pools and create a demand for the same temporary housing.

Cumulative population and housing impacts would likely be limited to a Project radius of approximately 75 miles (as a general rule, it is considered unlikely that construction workers would commute more than 75 miles to work). Furthermore, due to the relatively small area of potential effect, and the differing contexts within which the Projects would be built, cumulative impacts would need to be evaluated on a Project-specific basis.

The proposed Projects could contribute to increases in temporary and permanent job opportunities and populations in the region. Peak construction of each Project could employ about 165 workers, for a combined peak total of 500 workers. These estimates are based on the experience of the applicants at other facilities. The number of construction workers who would reside within or outside Kittitas County cannot be precisely predicted. Using the same assumptions in Section 3.12, 'Population, Housing, and Economics', of this Application and based on the Stateline Wind Project in nearby Walla Walla County for purposes of analysis, it is assumed that 30 to 50% of all workers would be local (i.e., already residing within reasonable commuting distance, defined as Kittitas or Yakima Counties) and the remainder would come from outside this localized area (e.g., Benton or King Counties). If conservatively 30% of wind facility workers are assumed to be local, 115 non-local workers would be employed by each Project, or a cumulative total of 345. The actual mix of local and non-local would depend on the availability and residence of construction workers with the particular skills needed for wind facilities, and competition from other concurrent construction projects in the region.

The majority of cumulative population and housing impacts would be temporary and would occur during construction. It is likely that some non-local construction workers would choose to live in housing located in Ellensburg or Yakima, both located within a reasonable commuting distance of the Project sites.

The workforce analysis conducted for the Wild Horse Project suggests that there is a sufficient labor supply available to complete both the Kittitas Valley and Wild Horse Wind Power Projects within the same time frame. If the Desert Claim Project were also

to be constructed simultaneously, the local workforce supply might be strained. The result may be to draw more workers from outside of the Project area, thus potentially affecting local population and housing.

Assuming that all three projects could be constructed simultaneously, temporary population increases resulting from construction work forces could result in cumulative effects to the local housing supply. Temporary housing would be needed for those workers that would re-locate to the Ellensburg area during construction of these Projects. There were more than 1,700 vacant housing units in Kittitas County in 2000 categorized as "seasonal, recreational, or occasional use" units. In addition, more than 40% of the county's total housing stock is rental housing, with a vacancy rate (per 2000 census data) of almost 7%. Motels/hotels, RV parks, and other transient lodging establishments in the Ellensburg and Cle Elum/Roslyn area could provide temporary lodging for wind power Project construction workers. Therefore, it appears that the study area has an adequate supply of temporary housing to accommodate the potential cumulative increase in construction workers from outside the area. Vacancy rates for temporary housing could decrease for a period of a few months, however.

Over their life times, each wind power Project is estimated to employ between 10 and 14 fulltime workers for operations and maintenance; cumulative operations employment would be between 30 and 42. These estimates are based on the applicants' experience with other projects, which suggests that about half of the operations workers could be local residents. However, even if all were assumed to come from outside the area, the cumulative housing impact from a population increase of this size would not be considered significant.

3.17.12 Employment Income and County Revenues

The three wind power projects would increase retail sales and overall economic activity in the area, as well as employment opportunities for residents of Kittitas County. The three projects would also substantially increase the amount of annual property tax revenue to the county. Estimated direct, indirect, and induced income generated by the three wind power proposals is shown below for the construction and operation phases. These estimates are based on analyses of jobs, income, wages, and similar economic impacts prepared for each proposal and included in the corresponding EISs or application materials (see Section 3.12 of this Application for a discussion of the methodology used for the Wild Horse analysis).

In general, the analyses indicate that the Projects cumulatively would generate substantial income for the local economy and residents, almost $16 million during the construction period and approximately $5.3 million annually thereafter (see Tables 3.17-2 and 3.17-3). The direct impact figures for the construction phase primarily represent local labor income assumed to be paid to construction workers. The indirect and induced impacts reflect the local income effect from local construction purchases and the re-spending of those dollars within the local economy. The direct impacts for the operations phase

(Table 3.17-3) include local labor income to operations employees and annual lease payments to landowners (which have been estimated at $4,500 per turbine per year).

Table 3.17-2: Cumulative Income Impacts Generated by Construction Employment in Kittitas County (2002$) for Kittitas Valley, Desert Claim, and Wild Horse Projects

	Desert Claim	Kittitas Valley [1]	Wild Horse [2]	Cumulative Total
Direct	$ 3,333,000	$ 4,577,100	$ 4,577,100	$ 12,487,200
Indirect	$ 433,000	$ 518,100	$ 518,100	$ 1,469,200
Induced	$ 502,000	$ 701,800	$ 701,800	$ 1,905,600
Total	$ 4,268,000	$ 5,797,000	$ 5,797,000	$ 15,862,000

Sources: ECONorthwest 2002, as amended by Sagebrush Power Partners LLC 2003c; Kittitas County 2003.

[1] *Assumes 121 turbines.*

[2] *Estimated to be the same as the KVWPP.*

Table 3.17-3: Annual Cumulative Income Impacts in Kittitas County during Operations (2002$) for Kittitas Valley, Desert Claim, and Wild Horse Projects

	Desert Claim	Kittitas Valley [1]	Wild Horse [2]	Cumulative Total
Direct	$1,041,000	$ 1,489,400	$ 1,489,400	$ 4,019,800
Indirect	$124,000	$ 59,400	$ 59,400	$ 242,800
Induced	$168,000	$ 436,700	$ 436,700	$ 1,041,400
Total	$1,333,000	$ 1,985,500	$ 1,985,500	$ 5,304,000

Sources: ECONorthwest 2002, as amended by Sagebrush Power Partners LLC 2003c; Kittitas County 2003.

[1] *Assumes 121 turbines.*

[2] *Estimated to be the same as the KVWPP.*

It is possible for some large projects to increase the demand for labor sufficiently to place upward pressure on wages in certain sectors of the construction industry. However, it is expected that contractors for the three proposed wind power Projects would have access to a large construction labor pool from a geographic area that includes Seattle and Yakima. Thus, the effect on construction wages and income would not likely be significant.

The Kittitas Valley, Desert Claim, and Wild Horse proposals have each prepared analyses that estimate the fiscal (i.e., governmental cost and revenue) impacts of the individual Project. Each Project analysis also considered indirect and induced economic impacts (quantitatively or qualitatively) as well as direct fiscal impacts. Although the studies were performed at different times and/or were organized differently, refined information is now available for some of the proposals. As such, they provide a reasonable overview and estimate of the fiscal effects of each wind power proposal. The reader should consult the respective analyses to obtain greater detail about economic and fiscal issues.

Cumulative fiscal impacts, as summarized here, are considered to be the simple addition of the direct costs and revenues of each Project. There is no synergistic effect assumed from multiple Projects in terms of direct revenues; such an effect could occur, however, in terms of indirect or induced economic effects (e.g., additional jobs, income, spending, etc.). For purposes of estimating cumulative impacts, each Project is assumed to be approximately the same size (+/- 120 turbines), and the value of each turbine is assumed to be assessed at approximately $765,000. (This value is slightly higher than the value of $750,000 used in the ECONorthwest report [ECONorthwest 2002, as amended by Sagebrush Power Partners LLC 2003c] that evaluated the Kittitas Valley Project, which was updated to apply to the three proposed wind power Projects.) Therefore, each Project would have an initial assessed value of over $90 million and the combined assessed value for all three projects would be over $270 million. The combined value of the three projects would represent an increase of more than 10% over the current assessed valuation for all real and personal property in Kittitas County of approximately $2.5 billion (Kittitas County 2003).

The estimated potential property tax revenues in the first operational year would be more than $3.8 million, and more than $1 million for each Project. (Revenues for Wild Horse are assumed to be the same as for the middle scenario for the Kittitas Valley, 121 turbines.) Differences in methodology used among the three projects (in this case, primarily the applied tax levy rate) results in different revenue estimates for Projects with similar capital characteristics. The allocation of this potential property tax revenue to various government agencies/funds and special districts is shown in Table 3.17-4.

Because the value of the turbines would depreciate over time, property tax revenues would also decline over their 30-year lifetime. Depreciation schedules applicable to the Projects are not available at this time.

Current statewide legal limitations on property taxes would likely result in actual tax revenues lower than those indicated in Table 3.17-4. Initiative 747 limits the growth of local government property tax revenues to 1% per year, although the I-747 cap does not apply to the assessed value of new construction. Because the total assessed valuation for Kittitas County would increase substantially (over 10%) with inclusion of the value of the wind power Projects, the tax rates levied against the total assessed valuation base might need to be reduced to stay within the I-747 limit. In that event, actual revenues derived from the Projects would be less than indicated in Table 3.17-4, although taxpayers would benefit from the reduced levy rate. On balance, the actual effect of the Projects on property taxes would likely be some combination of increased revenues and decreased levy rates (Kittitas County 2003).

The three proposals could also generate some costs for public services (e.g., fire protection, law enforcement, road maintenance) that might not be covered by mitigation requirements. To the extent that this occurred, it would reduce the fiscal benefits that would otherwise be associated with the Projects. These potential service costs have not been quantified but are estimated to be minor, both individually and cumulatively. Expected cumulative revenues are projected to be significantly higher than estimated

costs for the Projects and would result in a substantial benefit (a surplus of revenues relative to costs) for the affected local jurisdictions (Kittitas County 2003).

Table 3.17-4: Cumulative Potential Property Tax Revenues in Kittitas County with Wind Projects (First Operational Year)				
	Desert Claim	**Kittitas Valley**	**Wild Horse**	**Cumulative Total**
Local Schools	$ 375,700	$ 407,000	$ 407,000	$ 1,189,700
State	$ 264,800	$ 376,200	$ 376,200	$ 1,017,200
Road District	$ 149,700	$ 135,300	$ 135,300	$ 420,300
Fire Districts	$ 132,700	$ 80,300	$ 80,300	$ 293,300
County Government	$ 123,100	$ 168,300	$ 168,300	$ 459,700
Hospital District/Other Local Services[1]	$ 40,800	$ 63,800	$ 63,800	$ 168,400
Local Communities[2]	NA	$ 112,200	$ 112,200	$ 224,400
Total	$ 1,086,800	$ 1,343,100	$ 1,343,100	$ 3,773,000

Source: Kittitas County 2003.
Notes: Numbers rounded; NA = not available; revenue estimates based on assessed valuation calculated for each project and multiplied by levy rate of 1.18 for Desert Claim and 1.35 for Kittitas Valley and Wild Horse.
[1] "Other local services" included for Kittitas Valley and Wild Horse, not for Desert Claim.
[2] This category of revenue was not estimated for Desert Claim.

3.17.13 Cultural Resources

The proposed Project, in conjunction with other proposed or planned Projects, including the Desert Claim and Kittitas Valley Wind Power Projects, would result in ground disturbance that could potentially impact identified and unidentified prehistoric and/or historic sites, as well as cause impacts on traditional cultural properties. Cultural resource surveys have been conducted at each of the project sites. A summary of known resources identified in the wind Projects cumulative study area is summarized below.

As identified in Section 3.14, 'Cultural Resources', of this Application, cultural sites in or near the Wild Horse Project area include six previously recorded archaeological and historical sites and three previously unrecorded archaeological sites. Subsequently five additional previously unrecorded archaeological sites (rock features) were documented at the Wild Horse Project, as well as one historical property. Two previously unrecorded archaeological sites (lithic scatters) were documented for the Kittitas Valley Project. None of these cultural sites would be disturbed by proposed construction, although visible evidence of Project facilities would indirectly affect the setting for three of the sites (Kittitas County 2003).

The density of cultural resources in the Desert Claim Project area appears to be considerably greater than in the Kittitas Valley or Wild Horse areas. A field survey of the

Desert Claim Project area identified 13 previously unrecorded prehistoric sites and 18 previously unrecorded historic sites (as well as one recorded historical site), along with more numerous prehistoric and historic isolates. Potential direct and indirect impacts on those cultural resources could generally be avoided or reduced through final turbine "micro-siting" and other mitigation measures. Therefore, the combined effects of the three proposed wind power Projects on cultural resources appear to be the possible disturbance of a small number of sites and the alteration of the visual setting for up to 35 to 40 cultural sites (Kittitas County 2003).

During consultations between EFSEC and the Yakama Nation regarding the Kittitas Valley Project, tribal representatives expressed concern about the cumulative effect wind power Projects could have on tribal lands. Concerns raised on past wind Projects include how wind power developments may affect the cultural and spiritual practices of the Yakama People, particularly Projects located on sacred lands that could affect sacred foods and medicines (Benton County and Bonneville 2003). The Yakama Nation submitted a comment letter to EFSEC on the Kittitas Valley DEIS raising concerns regarding potential impacts to several resources including cultural, bird migration, lithosol degradation and riparian zones. Efforts to bring together wind power facility applicants, state and federal government agencies, and tribal representatives to discuss these and other issues of concern are ongoing. The Confederated Tribes of the Colville Reservation (CCT) expressed potential concerns about Traditional Cultural Properties for the Wild Horse Project (CCT 2004). The Applicant and EFSEC met with CCT on February 19, 2004 and the Applicant is responding to CCT's concerns.

While impacts from these and other Projects in Kittitas County could result in a net cumulative loss of cultural resource values in the region, implementation of mitigation programs in each individual Project should help to limit Project-specific impacts, therefore reducing overall cumulative impacts on cultural resources.

3.17.14 Visual Resources

Figure 3.17-1 shows the locations of the proposed Kittitas Valley, Desert Claim, and Wild Horse Wind Power Projects around the Kittitas Valley. As this map indicates, the Kittitas Valley and Desert Claim Projects are relatively close to each other (within 1.6 miles at the closest point), while the Wild Horse Project is 14 miles from the Desert Claim Project and 21 miles from the Kittitas Valley Project.

In addressing the potential cumulative visual impacts of multiple wind power Projects, it is most important to consider the Desert Claim and Kittitas Valley Projects together because of their proximity. Because the Wild Horse Project is located so far from the other two Projects and in an entirely different portion of the landscape, it has limited potential to be seen in the same view as the other two Projects. Should both the Kittitas Valley and Desert Claim Projects be built, the visual consequences would include approximately 240 wind turbines (120 for each project) on the valley floor and adjacent slopes in the north-central portion of the Kittitas Basin.

The Kittitas Valley and Desert Claim Projects were examined to identify the extent to which there are viewpoints from which both projects could be seen in foreground to middle ground views. Because of topographic conditions, there are no areas where the Kittitas Valley Project could be seen in the foreground and the Desert Claim Project in the middle ground or background. However, there are a number of locations where the Desert Claim Project could be seen in the foreground to middle ground and the Kittitas Valley Project could be seen in the middle ground to background.

Figure 3.17-2 shows the locations of two viewpoints selected to simulate the cumulative visual impacts of the Kittitas Valley and Desert Claim Wind Power Projects. These two viewpoints are representative examples of the combined effects of both Projects on views from these areas.

Viewpoint 1 is located on Reecer Creek Road at a point slightly west of the Kittitas County Fire District Station No. 2. Figure 3.17-3 illustrates the existing view from Viewpoint 1 on Reecer Creek Road, looking northwest. Simulated views of the Kittitas Valley Project, Desert Claim Project, and combined (cumulative) scenario with both Projects are shown in Figures 3.17-4, 3.17-5, and 3.17-6, respectively. All views are shown from Viewpoint 1 on Reecer Creek Road looking northwest. The Kittitas Valley Project would be seen in the middle ground to background zones, whereas the Desert Claim Project would be much more prominent, seen in the near middle ground zone. The addition of the Kittitas Valley Project in the middle ground to background zones of the view with the Desert Claim Project in the near middle ground would not substantially increase the effect that the Desert Claim Project alone would have on the visual character and quality of the view.

Viewpoint 2 is located just outside of the National Forest boundary where the view expands sufficiently to allow substantial portions of both the Kittitas Valley and Desert Claim Projects. Figure 3.17-7 shows the existing view from outside the Wenatchee National Forest, looking south. Figure 3.17-8 is a simulation from this viewpoint that illustrates what the Kittitas Valley would look like with development of both Projects. The view in this figure is also looking south from outside the Wenatchee National Forest. Both Projects would be located in the background zone of this view, but would substantially alter the existing visual character and quality of the Kittitas Valley from this viewpoint.

Because the Wild Horse Project is located so far from the other two Projects and in an entirely different portion of the landscape, it has limited potential to be seen in the same view as the other two Projects. There may be some locations near the Kittitas Valley and Desert Claim Wind Power Project sites from which there is an unobstructed line of sight toward Whiskey Dick Mountain and the Wild Horse Project site. However, because of the large distances involved (21 miles from the Kittitas Valley Project and 14 miles from the Desert Claim Project), the Wild Horse turbines would be barely (if at all) detectable and would have essentially no effect on the view.

There may also be some viewpoints in or near the valley from which all three projects would be visible. One example is a segment of I-90 as it enters the Kittitas Basin near the Elk Heights interchange. The eastbound view in this instance includes the northern margin of the valley (with large portions of both the Kittitas Valley and Desert Claim Project areas) and Whiskey Dick Mountain in the distant background. In this case, the Kittitas Valley and Desert Claim turbines would be 2 to 10 miles away, while the Wild Horse Project would be so far away as to be an insignificant background feature (Kittitas County 2003).

The preceding discussion addresses the potential for cumulative visual impacts from specific viewpoints or localized areas. The overall effect of multiple wind energy Projects on the regional landscape and the experience of viewers when considered over time and at multiple locations is also a consideration. For example, drivers passing through Kittitas County on I-90 would likely notice a major wind development (the Wild Horse Project) for a time in the stretch of highway east of the Columbia River and again in the eastern end of the Kittitas Valley (primarily around the community of Kittitas), and could subsequently view a more extensive area of wind turbines to the north and west of Ellensburg (the Desert Claim and Kittitas Valley Projects). Travelers would be likely to recall having seen a collection of wind turbines a few minutes before seeing more wind turbines. This progressive realization could leave the impression with some viewers that wind turbines are plentiful in Kittitas Valley.

This type of impression would also occur for residents of and frequent visitors to the local area. While residents of Ellensburg, for example, might not see turbines from one or more of the wind Projects on a daily basis, they would likely experience repetitive views of wind turbines through their local travels over a period of weeks, months, or years. Consequently, some local residents and frequent visitors might perceive a substantial change to the overall character of the Kittitas Valley landscape, and such a response would be more likely with the development of multiple wind Projects (Kittitas County 2003).

The development of the three proposed wind power Projects would also cumulatively contribute to increased nighttime lighting in the Kittitas Valley. At present, the proposed wind power Project sites and surrounding areas are relatively dark at night. Proposed flashing red lights required by the FAA on the tops of a certain number of turbine towers would be most noticeable in the areas within a mile of each project.

3.17.15 Transportation

If two or more large Projects were constructed on similar or the same schedules, such as the Kittitas Valley, Desert Claim, and Wild Horse Wind Projects, commuting construction workers and construction supply and material deliveries could contribute to added congestion on the same local roads and highways. For example, the Kittitas Valley and Desert Claim sites are less than 5 miles apart by surface road, increasing the

likelihood that construction workers and delivery trucks at both sites could use common routes.

Planned transportation improvement projects could also reduce capacity on local roads, making the burden of additional commuter traffic difficult to absorb. Some temporary cumulative impacts on the local road and highway network would result from the combined construction activities.

The Applicant has prepared a cumulative traffic impact analysis of construction traffic from the Kittitas Valley and Wild Horse Projects, which is summarized below. It is followed by a discussion of the possible added construction traffic effects of the Desert Claim Project.

3.17.15.1 Kittitas Valley and Wild Horse Wind Power Projects

There are two transporter routes for the Wild Horse Project. Both routes begin in the City of Seattle and continue east on I-90. These routes overlap with the entire I-90 segment of the Kittitas Valley Project transporter route and continue on to the towns of Kittitas (Exit 115) and Vantage (Exit 136).

The primary route used to transport equipment to the Kittitas Valley site begins in the City of Seattle and continues east on I-90 to US 97 (Exit 106) in Ellensburg. In the vicinity of the project, I-90 is classified as a rural-interstate, according to the WSDOT road classification system. The segment of I-90 immediately west of Exit 106 carries an ADT volume (in both directions) of 22,000 vehicles, with an estimated 21% trucks (WSDOT 2001).

In the event that construction occurs simultaneously for the Kittitas Valley and Wild Horse Projects, the segment of I-90 immediately west of Exit 106 may temporarily carry construction traffic for both Projects. This is the only roadway that may potentially be affected by combined construction traffic.

To analyze the combined effects, base year (2001) traffic volumes on this I-90 segment were forecast to the year 2004 using a 2% growth factor. This 2% growth factor is based on historical ADT levels and background growth in the Cle Elum and Ellensburg area due to large nearby capital projects. The growth on this roadway is considered reasonable because of the area's rural nature. This growth resulted in a background 2004 ADT of 23,320 vehicles (Table 3.17-5). Peak-hour traffic volumes in one direction were estimated at 1,210 vehicles for 2001 and 1,283 vehicles for 2004, based on a standard 10% peak- hour factor and a 55% directional factor to the respective ADT levels for two-direction traffic in each year.

Methodology from the Highway Capacity Manual (HCM) (Transportation Research Board 2000) is typically used to determine the LOS for a roadway. LOS A represents free flowing conditions (the equivalent of 11 or fewer passenger cars per lane mile for a freeway), while LOS F represents extremely congested conditions (more than 45

passenger cars per lane mile). Applying the HCM methodology for a freeway to the baseline conditions for the segment of I-90 west of Exit 106 indicates this roadway segment would function at LOS A under the baseline condition in both 2001 and 2004.

The estimated construction traffic volumes for the Kittitas Valley and Wild Horse Projects were then added to the 2004 background traffic volumes to achieve a combined peak-hour directional volume. As a worst case, the Kittitas Valley Project is estimated to generate 149 heavy construction trips and 20 light duty delivery truck trips traveling on I-90, for a total of 169 peak-hour trips (middle scenario). The Wild Horse Project is estimated to have 143 heavy construction trips and 15 light duty delivery truck trips for a total of 158 peak-hour trips traveling on Transporter Route 1. Transporter Route 2 of the Wild Horse Project is estimated to carry six heavy construction trips in the peak hour.

The combined construction traffic for the Kittitas Valley and Wild Horse Projects would result in a total maximum peak-hour volume of 1,616 vehicles (Table 3.17-6). The combined volume was then analyzed for LOS. Based on the most current HCM guidance for freeway segments, with the estimated combined baseline and construction traffic volumes during the PM peak hour, this segment of I-90 would continue to operate at LOS B during the construction period. By state standards, the LOS threshold for rural highways is LOS C. Therefore, while the combined construction traffic for the Kittitas Valley and Wild Horse Wind Power Projects could result in a temporary decrease in the LOS on I-90, there would not be a significant impact on traffic operations.

Table 3.17-5: Existing and Future Daily and Peak-Hour Traffic Volumes and LOS without Project

Roadway	Daily		Estimated Directional Peak Hour without Project			
	2001	2004	2001	LOS	2004	LOS
I-90 (west of US 97)	22,000	23,320	1,210 (10.1 cars/lane mile)	A	1,283 (10.7 cars/lane mile)	A

Sources: Kittitas County 2003.

Table 3.17-6: Total PM Peak Hour and LOS for Combined Construction Impacts on the Roadways from the KVWPP and Wild Horse Project

Roadway	2004 PM Peak[1]	Kittitas Valley Transporter Route 1[1]	Wild Horse Transporter Route 1[1]	Wild Horse Transporter Route 2[1]	Total PM Peak[1]	LOS
I-90 (west of US 97)	1,283	169	158	6	1,616 (13.4 cars/lane mile)	B

Sources: Kittitas County 2003.
[1] *Directional volumes*

3.17.15.2 Desert Claim Wind Power Project

Peak-hour construction trips for the Desert Claim Project have not yet been estimated, although total turbine delivery trips and potential concrete delivery trips are identified. Assuming that the volume of construction trips for the Desert Claim Project would be similar to the volumes estimated for the Kittitas Valley and Wild Horse Projects (based on the similar size of the Projects), total peak-hour trips shown in Table 3.17-6 would be increased by approximately 120 to 140 trips. Applying a mid-range factor of 130 trips, the total peak-hour trips in 2004 if all three proposed Projects were under construction simultaneously would be close to 1,750. This corresponds to an equivalent of 14.7 passenger cars per lane mile, an operating condition that is still within the numerical range for LOS B. Therefore, the added effect of the potential Desert Claim construction traffic would not result in a significant cumulative impact on the operating condition for I-90 during the construction period (Kittitas County 2003).

Aside from the increased traffic on I-90, there would be relatively little combined construction traffic effects on other roadways because of the geographic separation of the three projects. Cumulative increases in general construction traffic volumes would likely be restricted to roadways in the area around the intersection of I-90 and US 97, and would be associated primarily with the Kittitas Valley and Desert Claim Projects. If turbine components or offsite gravel materials were being delivered to multiple Projects at the same time, there could be increased delays or additional detours within the area near the Kittitas Valley and Desert Claim Projects. Additional vehicle delay could affect segments of US 97 and Smithson Road. The potential for delay could be reduced if the contractors for the different Projects coordinated the delivery of turbine components to avoid a situation in which a number of transporters were traveling at the same time on a given road segment.

3.17.15.3 Cumulative Tourist Traffic

Development of multiple wind power Projects in the Kittitas Valley area would likely result in a larger total number of tourists visiting these facilities compared to conditions if just one Project were built. However, with the geographic separation of the proposed Projects, roads adjacent to the Wild Horse Project (for example) would not likely experience substantially more tourist traffic because one or two other Projects were developed. In fact, the presence of additional wind power Projects could result in spreading tourists over a larger portion of the valley, with fewer tourist visits to a single Project than might otherwise be expected. Tourist interest in multiple wind Projects would likely result in an increase in the amount of traffic on local roads near the respective Project areas. The tourist traffic would likely be localized to the individual areas around the Projects and would not likely be cumulative (i.e., it is likely that most tourists interested in wind energy would visit any one of the Projects but would not visit two or all three projects).

3.17.16 Air Quality

Construction of the Projects would result in construction-related emissions such as fugitive dust from foundation excavation and cable trenching, and vehicle and equipment exhaust. Construction of the Wild Horse Project concurrent with the other two proposed wind power Projects would temporarily increase total regional dust loads in the atmosphere. Due to the proximity of the Kittitas Valley and Desert Claim Projects, the intensity of this potential cumulative air quality impact would be greatest if construction of these two Projects were to occur concurrently. Even with construction-related fugitive dust emission controls, the overall number of truck trips required to haul materials to the different construction sites could be significant.

Gravel required for the Wild Horse Project would be quarried onsite, and transportation would not be required. However, gravel needed for construction of the Kittitas Valley and Desert Claim Projects would likely be transported from offsite sources. If substantial amounts of heavy-duty truck trips are required to haul gravel to the Kittitas Valley and Desert Claim Project sites, there could be greater exhaust emissions from additional vehicle traffic and greater dust emissions from additional traffic on gravel roads for these two Projects. This activity could result in a temporary increase in localized cumulative air quality impacts on travel routes shared by the two Projects but not at a broader countywide level. This potential impact would be greatest if construction activities for the Kittitas Valley and Desert Claim Projects overlapped and occurred during periods of peak winds.

The air emissions from contemporaneous construction of multiple wind Projects would be additive in terms of their contribution to total regional pollutant loads. Based on the combined area of wind Project construction activity and volume of construction traffic relative to existing sources of air emissions in Kittitas County (e.g., vehicle traffic on I-90 and other roads and agricultural activities on over 350,000 acres of commercial agricultural lands), however, the incremental impact of the aggregate air emissions from construction of multiple wind power Projects would not be sufficient for regional air pollutant concentrations to temporarily exceed the applicable air quality standards. Consequently, there does not appear to be a potential for significant regional cumulative air quality impacts from the development of multiple wind power Projects in the Kittitas Valley, even if all three projects were constructed during the same period (Kittitas County 2003).

The only anticipated cumulative air emissions during operation of the three proposed wind power Projects would be from vehicles used for operations and maintenance activities. Given the small number of employees and associated trips anticipated during Project operations, no significant aggregated air pollutant concentrations that would exceed NAAQS/WAAQS standards are anticipated. In addition, the generation of electricity by the three proposed wind power Projects would avoid cumulative emissions of regulated pollutants from other fossil-fuel sources of power that might have otherwise been built or operated to produce an equivalent amount of electricity.

3.17.17 Noise

Construction noise would be temporary in nature, and would primarily be from operation of construction equipment and vehicles. The magnitude of this temporary cumulative impact would depend upon the timing of construction activities, but any adverse effects would be limited to the area immediately surrounding each construction site.

The Wild Horse Project would not affect noise levels at any residences or other permanent receptors. Given the distances that separate the Wild Horse Project from the Kittitas Valley and Desert Claim Projects, Wild Horse Project operations would not contribute to cumulative noise impacts in the region.

The proposed Kittitas Valley and Desert Claim Project sites are located near each other (within 1.6 miles at the closest point). However, receptors located between these two Projects should not be affected by combined construction activities even if their construction schedules were to overlap. There would be significant decreases in construction equipment noise levels at distances of about 5,000 feet (less than one mile) from the source, therefore minimizing potential cumulative noise effects. The two Projects are a sufficient distance apart that residents near the Desert Claim Project would not also experience elevated noise levels from Kittitas Valley Project facilities and vice versa. Noise modeling results for both Projects indicate that receptors located between the two Projects would be unlikely to notice increases in noise levels as a combined effect of the Projects (Kittitas County 2003).

Consequently, potential noise impacts from the proposed wind energy Projects would be confined to certain Project-specific locations, and there would not be cumulative noise impacts from the development of multiple wind Projects. Furthermore, proposed wind energy facilities would be subject to Department of Ecology noise restrictions and mitigation could be required if permissible levels are exceeded for nearby EDNAs (i.e., the area or zone within which maximum permissible noise levels are established).

3.17.18 Public Services and Utilities

Cumulative impacts on public services would result from development of the three wind power projects. Concurrent development of the three projects could create significant additional demand for law enforcement, fire protection, and emergency medical service response during both construction and operations and maintenance phases. The level of impact would depend on the timing of concurrent construction activities as well as the availability of emergency response resources at the time of an incident.

For example, calls for law enforcement service could increase during the construction phase because of traffic accidents and construction site theft or vandalism. The cumulative potential number of increased calls has not been quantified but is not anticipated to be significant. All three wind power Project applicants would provide

onsite security for their respective Projects. Impacts during Project operations could result from calls for service in connection with vandalism or trespass but would not be expected to be cumulatively significant. The three proposed Projects would increase the risk of fire and the potential need for emergency medical services from accidents during both construction and operation. The western portion of the Desert Claim Project area is included within Kittitas County Fire District 2, while the remainder is not within an existing fire district service area (Kittitas County 2003). Most of the Kittitas Valley Project area is outside existing fire district boundaries, although Fire District 1 serves a portion of the site. No part of the Wild Horse site is within a rural fire district. The Applicant intends to contract with the appropriate rural fire district to obtain required fire protection services. For all three projects, such contracts would extend coverage to areas not presently served by a fire district. If a fire service contract does not cover the actual costs of extending service to a Project, there could be a gap between the time service is provided and the realization of Project-generated property tax revenues. Successful implementation of emergency response and fire prevention and risk mitigation plans would minimize potential significant cumulative impacts.

Increased permanent worker populations required to operate the three proposed wind power facilities could contribute to increased cumulative demands for school services in central and eastern Kittitas County. The combined operations work force of the three projects would be 30 to 42 workers. If all of these workers were hired from outside the local area and all or most of those were located in a school district with capacity limitations, there could be adverse impacts on school services. These circumstances, however, are considered unlikely because local residents would probably fill a portion of the operations jobs, and it is unlikely that all of the in-migrants would locate in the same school district. Therefore, no significant cumulative adverse impacts on schools are anticipated from Project operation.

Cumulative impacts on utility service providers would consist primarily of cumulative increases in the demand for solid waste disposal services. However, this cumulative increased demand would be limited to Project construction and is not anticipated to be significant with respect to either collection capability or the capacity of the County's construction and demolition waste disposal site.

No long-term cumulative impacts on regional water and wastewater treatment plants are anticipated because water and wastewater demands would be limited to temporary needs generated during construction activities and those from operations and maintenance staff. It is anticipated that long-term cumulative water and wastewater needs would be met through Project specific water wells and septic tanks, and would therefore not burden the region's treatment processes. The combined effects of the three projects would not result in a significant cumulative impact.

Because no individual impacts are anticipated from each Project, no cumulative impacts to telecommunications are anticipated. Based on the distances between the respective Project facilities, there does not appear to be a potential for significant cumulative

interference impacts on radio and television reception in the areas near the proposed wind power Projects (Kittitas County 2003).

3.17.18.1 Cumulative Impacts to Utility Grid

In order to be interconnected to either the BPA or PSE grids, the Projects will require interconnection and transmission agreements which comply with FERC (Federal Energy Regulatory Commission) and NERC (National Electric Reliability Council) standards. The interconnection and transmission agreements ensure the safe and reliable delivery of power from the Project to the grid.

In order to gain access to the grid, every type of power project wishing to access the grid must apply for access under the utility's OATT (Open Access Transmission Tariff). Under the OATT both a detailed System Impact Study (SIS) and a Facility Study (FS) need to be performed by the interconnecting host utility. The detailed SIS engineering work performed examines the impacts to the grid of injecting power from the Project including the power injected from other Projects. The Facility Study examines the costs and schedule requirements to construct the interconnection facilities to allow for the injection of power from the Project. The main purpose of the rigorous SIS is to determine the requirements for the interconnection facilities to provide adequate system protection, grid stability and to ensure that overall reliability is maintained. All three projects are currently under study (i.e. SIS and FS) by both BPA and PSE.

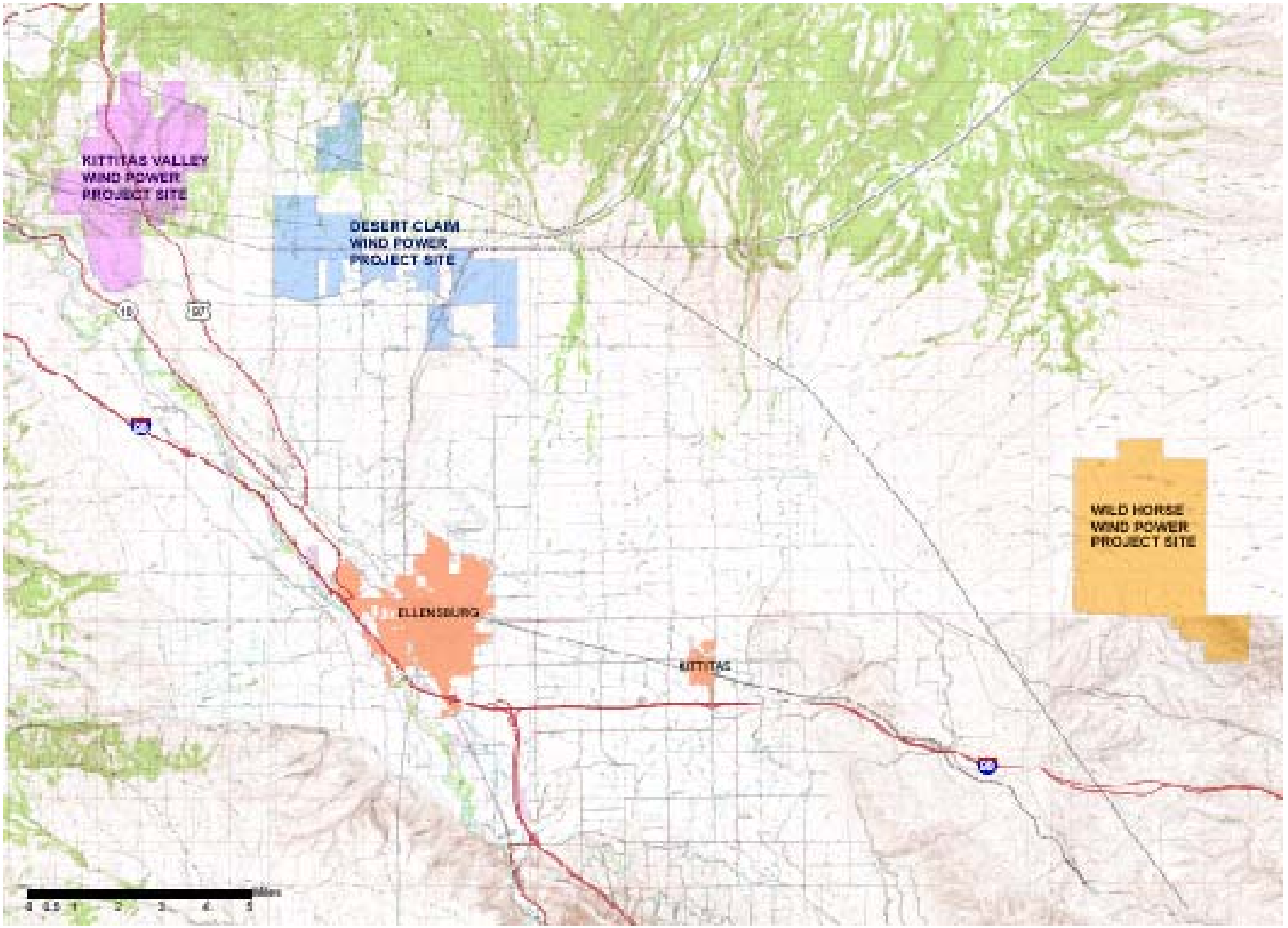

Figure 3.17-1: Proposed Project Site Locations

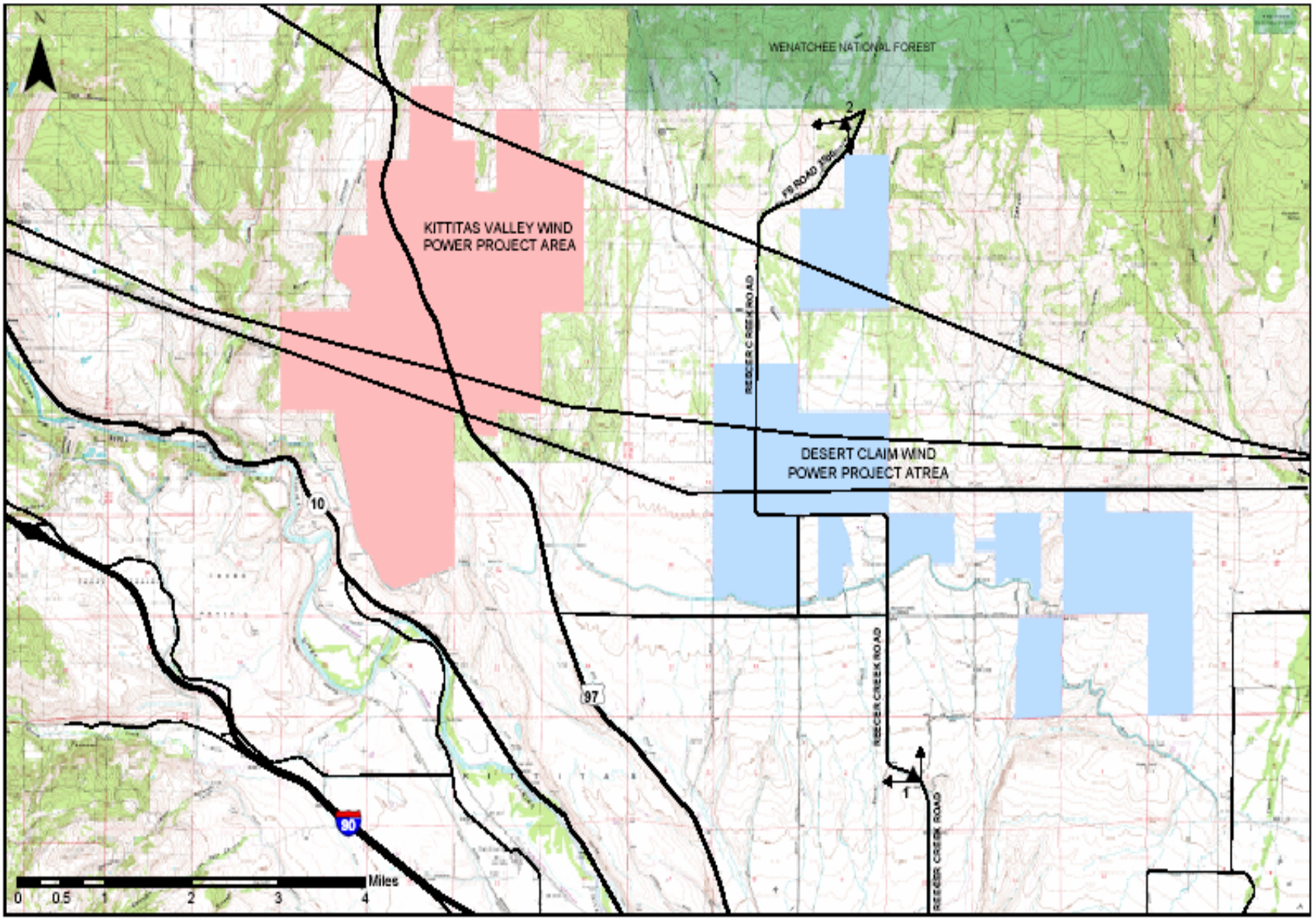

Figure 3.17-2: Photograph Locations for Cumulative Analysis

Figure 3.17-3: Viewpoint 1: Existing Conditions

Figure 3.17-4: Viewpoint 1: Simulated Conditions Kittitas Valley Wind Power Project

Figure 3.17-5: Viewpoint 1 Simulated Conditions Desert Claim Wind Power Project

Figure 3.17-6: Viewpoint 1, Simulated Conditions Cumulative Scenario

Figure 3.17-7: Viewpoint 2 Existing Conditions

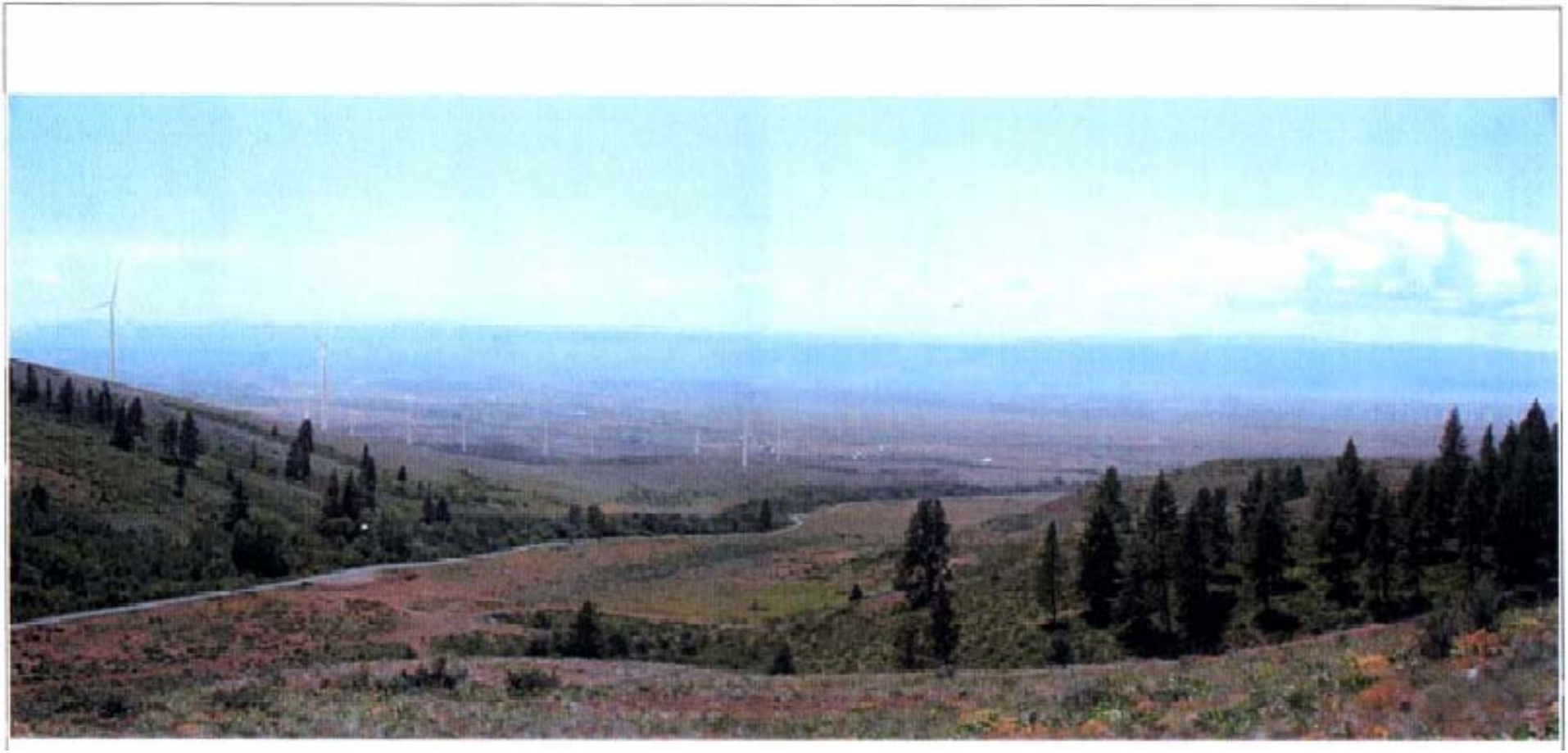

Figure 3.17-8: Simulated Conditions Cumulative Scenario